ORIGINAL ARTICLE

Fertility related knowledge and perceptions of fertility education among adolescents and emerging adults: A qualitative study.

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ABSTRACY

Research shows that young people do not know much about their fertility. In the present study we examined fertility knowledge and perceptions of a fertility educational brochure (i.e., 'A Guide to Fertility') in five focus groups with adolescents (16-18 years, n=19) and emerging adults (21-24 years, n=14) who were childless, not currently pregnant (or for men partner not pregnant) or trying to conceive but intending to have a child in the future. Participants (n=33) reported having poor knowledge of a range of fertility topics and feelings of surprise, fear and concern in response to the informational brochure, despite perceiving benefits of the provision of fertility education and feasibility of 'A Guide to Fertility'. Comparison between age groups showed that adolescents lacked confidence in their fertility knowledge and emerging adults more frequently referred to gender and family planning issues when considering the fertility information. The findings show the need and importance of ensuring fertility education is tailored to different age groups for it to be integrated at specific stages of the life course and optimise its benefits over costs. Results point to educators and researchers working together to determine how best to disseminate fertility information to relevant age groups.

KEYWORDS: Fertility knowledge; education; qualitative; adolescents; emerging adults; fertility awareness.

Introduction

Fertility awareness concerns level of knowledge about reproduction, fecundity and fecundability, risk factors for reduced fertility, and the societal and cultural factors affecting family planning and building (Zegers-Hochschild et al., 2017). Research to date shows that young people (mean age < 24 years) have poor knowledge on a range of these fertility topics (e.g., Mogilevkina, Stern, Melnik, Getsko, & Tydén, 2016; Rovei et al., 2010). There are costs to poor knowledge even for young people including inadvertent exposure to factors that reduce fertility (e.g., lifestyle, cultural practices; Bunting, Tsibulsky, & Boivin, 2012) and unnecessary exposure to painful, early onset symptoms that are normalised (e.g., severe menstrual pain, heavy menstrual; Harlow & Campbell, 2004; Hudelist et al., 2012). In the longer term the lack of knowledge is related to feelings of immunity to fertility problems, to misconceptions about fertility being robust and to beliefs that fertility is possible beyond its natural time frame (Bunting & Boivin, 2008). These beliefs could cause misinformed decision-making about when to start a family or about postponing childbearing (Virtala, Vilska, Huttunen, & Kunttu, 2011) and its associated higher risk of reduced fertility, longer time to pregnancy, inadvertent childlessness at end of life, and poor health in pregnancy (Schmidt, Sobotka, Bentzen, & Nyboe Andersen, 2011).

In light of these findings there has been a call for the provision of accurate fertility information in school curriculums in Britain with a call for research exploring what the content of the new curriculum could be, and how it could be integrated in schools and its effects evaluated (Boivin, Bunting, & Gameiro, 2013; Boivin et al., 2018; Harper et al., 2017; Littleton, 2014). Research does show that provision of fertility information increases knowledge (Garcia, Vassena, Prat, & Vernaeve, 2016; Maeda et al., 2016; Oliveira, 2015; Williamson, Lawson, Downe, & Pierson, 2014; Wojcieszek & Thompson, 2013) and that young people have favourable attitudes toward the dissemination of fertility information

through social media and health care providers such as general practitioners (Garcia et al., 2016; Hammarberg, Collins, Holden, Young, & McLachlan, 2017; Hammarberg, Norman et al., 2017; Littleton, 2014). To date, reactions to fertility information have not been examined among adolescents despite these being the target of current fertility education initiatives in the UK (i.e., Fertility Education Initiative, Harper et al., 2017).

For fertility educational initiatives to be effective an understanding of the needs and interests of the target population is required (Garcia et al., 2016). According to Bowen and colleagues (2009), qualitative methods are often a more optimal methodology to elicit data on the feasibility and acceptability of new interventions and processes. Indeed, an in-depth qualitative study of the fertility knowledge of British teenage girls showed them to know a fair amount about diverse fertility topics (Littleton, 2014). However, the quality of the knowledge possessed was often poor (inaccurate, vague) and was poorly applied to life settings; limits to fertility were disregarded and poorly integrated in personal ambitions or sociocultural understandings (e.g., older parenthood acceptable if in line with personal preference). As such a qualitative approach to reactions to fertility information might reveal positive or negative evaluations of fertility information but also how young people think they would apply this information in the context of their own lives.

The aim of our research programme was to evaluate the effect of fertility information on fertility-related cognitions, emotions and knowledge acquisition in male and female young people < 24 years). We carried out quantitative experimental work that compared the effects of fertility information ('A Guide to Fertility') among adolescents and emerging adults (male and female, Boivin et al. (2018). The results showed that provision of fertility information was associated with benefits (increased knowledge in 21 to 24 year olds) but also some costs (increase in infertility threat for adolescents and emerging adults). The aims of the present study were to explore in more depth the fertility knowledge of another

cohort of adolescents (aged 16-18 years) and emerging adults (aged 21-24 years) and their perceptions of the fertility educational brochure ('A Guide to Fertility'). It was expected that the findings could help inform the development (content, tailoring) of health education initiatives to be used in school curriculums.

Materials and methods

Participants

Eligible participants were aged 16-18 (adolescent group) and 21-24 years (emerging adults), childless, not trying to conceive or currently pregnant (for men, partner not pregnant), presumed fertile and intending to have a child in the future. Convenience sampling was used, and group composition determined from those willing to participate. Young people from the author affiliated university, secondary schools in the same geographical region, and Birmingham and members (< 24 years) of the Women's Voices Involvement Panel (WVIP, Royal College of Obstetricians and Gynaecologists, London) were invited to participate in the study. Secondary students were invited to the study at their morning assembly, before the start of classes, and were not offered incentive for participation on advice their headmaster. University students were recruited from the entry hall of the student union, during lunchtime with the added incentive of free pizza. Women in the WVIP were invited via email and their travel expenses paid, offered tea and biscuits, and given a £10 shopping voucher. The Birmingham group was recruited from young people known to one of the authors (AS) and not offered incentives.

Materials

A "focus group discussion guide" consisting of 12 questions and a series of informal prompts was derived from previous research and methods (Krueger & Casey, 2000). The

guide aimed to first aid discussions about the amount, nature and source of current fertility knowledge, perceptions of factors that could impact on fertility and the importance of fertility topics at different ages. The discussion started with general questions (e.g., what do you think the word fertility means, what topics are most important in terms of fertility, what factors could impact fertility) with necessary prompts based in replies (e.g., what is normal, how would that factor affect fertility). Participants were then also encouraged to discuss their perception of the provision and content of a fertility education brochure ('A guide to Fertility' see below). Questions focused on what they liked and disliked about the brochure as well as what they had learnt from it. General questions about the brochure (e.g., what did you like about the brochure, what do you feel you have learnt from it) followed by specific questions depending on replies (e.g., is X something you would like to see in a health brochure). At the end of the of the focus group participants were asked two further questions which were "what do you feel was the most important topic discussed today?" and "why?", to ensure that all important topics were captured.

The "fertility education brochure" examined during the focus groups was 'A Guide to Fertility' (Boivin et al., 2018). It was used to provide a concrete example of what providing fertility information could entail. The brochure contained four pages (3,004 words) of information, divided into nine sections concerned with fecundity, infertility and its risk factors, signs and symptoms, and reproductive options) derived from the information proposed to be relevant in past fertility education studies and topics relevant to fertility awareness (Zegers-Hochschild et al., 2017). Each section comprised graphics to aid learning and links to information sources (e.g., National Health Service (NHS), Human Fertilisation and Embryology Authority) where participants could receive more information about the topic. The Guide also included a glossary of terms. Graphic designers produced

the brochure to appeal to younger men and women (aged < 24 years) (Scarlett Design Agency, http://www.scarletdesign.com).

Procedure

Five focus groups were carried out in English, four mixed-gender and one single sex female group. For the adolescents, focus groups were carried out during school (Jan 23 and 27, 2017) morning sessions or (in London) at the weekend in London and Birmingham (Feb 18, March 25, 2017 respectively). The mixed gender groups had a maximum of six students per focus group, but the single sex group had 11 (eight adolescents and three emerging adults). At the start of the focus group any questions were answered and consent forms were signed. Participants were provided with a set of ground rules (e.g., confidentiality, feeling free to express opinions even if it differed from others, no right or wrong answers) and alerted to presence of audio recorders, as per consent. Following the discussion of fertility topics, participants were given a copy of 'A Guide to Fertility' and instructed that they had 15-20 minutes to read through it and form a view of the information provided. A general discussion of the Guide followed. The procedure was the same for emerging adults except that participation took place during the afternoon in London and the authors affiliated university (Jan 25, March 2, 2017). The focus groups carried out in the educational institutions were approximately 45 minutes long (due to time constraints of classes and courses) whereas the weekend focus group was two hours. Only the first hour covered the topic of fertility and the second covered other gynaecological/women's health issues, data not presented in the present paper. The School of Psychology ethics committee (Cardiff University) provided ethical review (Reference number: EC.16.03.08.4472GR2A3) and approval for the study (including consent for audio recording of discussions).

Data management and analysis

The focus groups had digital recordings and were transcribed for analysis. In one focus group a technical error occurred and instead the note taker's record was used (note taker present in case of technical error). Data from all focus groups were combined. Lower and higher level themes were extracted using inductive coding (AS) and discussed between two researchers (JB, KB). Differences among age-groups were also examined. Software was not used. Illustrative quotes were used. Quotes for adolescents and emerging adults were indicated with A and EA respectively and those from men were indicated with M, otherwise quotes were from women.

Results

Participants

A total of 33 adolescents (*n*=19, six boys, 13 girls) and emerging adults (*n*=14, four men, ten women), participated.

Data Generation

Thematic analysis yielded seven broad themes: four were shared across age groups and three unique to the age groups.

1. Shared themes

a. Poor knowledge of fertility

Adolescent and emerging adults' had poor knowledge of fertility. Participants evidenced a lack of knowledge about fertility "very little" [A], "I'm not even sure if I could even define to be honest" [A-M], and the factors that may affect fertility. The knowledge reported was

limited “must admit I’m lacking. My knowledge doesn’t expand much past there” [A-M], and lacked depth and precision, and often offered tentatively “x-rays and phones, probably” [EA-M]. Participants were aware that they did not know as much as they might or should know about fertility “at school you don’t learn a lot” [A], “there seems to be lots of myths around about fertility” [A].

When asked what factors were thought to affect fertility a diverse set was produced including health risks that have general effects on health (e.g., smoking, drinking) as well as specific fertility risks (e.g., radiation, genetics, contraceptive pill, past abortion, sexual orientation, cultural and religious practices). However, there was variability in ability to explore these factors in any depth. For example, participants mentioned that drugs might have an impact on fertility, but their ability to expand on this was limited or tentative “hard drugs like heroin?” [A]. It was also noted that participants did not have much knowledge surrounding fertility problems and how to protect their fertility. When asked for signs that might indicate a problem with fertility, the responses focused on the menstrual cycle “missing a period, erratic periods” [A], “[…] changes in discharge” [EA], although they were aware that their age might also impact on this “it is hard when you are younger because your periods can be all over the place” [A]. There were other suggestions related to menopause “…bloating, hot flushes” [EA].

Most frequently acquisition of knowledge originated from subjects taught at school but respondents were often unable to recall fully what had been learnt “I think I did it in the science section of general studies, briefly” [EA]. Some knowledge was gleamed from media “I think I saw it on Hollyoaks [popular soap opera] once a guy had to do it [semen analysis] into a thing” [A]. Another source of information for participants was friends and family “My Mum. I can ask her anything” [A], “talking to friends, discussion with friends about things” [A]. Some women were using fertility apps to track their menstrual cycles that

were perceived as helpful “I use an app … that tracks your cycle and lets you put in information about your mood, PMT etc. It’s good because it is personal to you” [A]. Few people in the group knew people with fertility problems, and if mentioned, it was in relation to use of reproductive technologies that were poorly understood “even though the child is older…they got various sets of eggs frozen…lots of batches left” [A-M].

b. Emotional reactions to information

Feelings of surprise, fear and concern for personal welfare were expressed about the information presented in the Guide. One piece of information elicited a consensus reaction of surprise was the age at which family planning should begin. The Guide provided the Habbema matrix of start ages according to desired number of children, certainty of wanting to achieve that specific parenthood goal and willingness to use in vitro fertilization (IVF) if fertility problems were encountered (Habbema, Eijkemans, Leridon, & te Velde, 2015). For example, a woman would need to start trying to get pregnant at the age of 23 for 90% certainty to have three children without fertility treatment, and this age shocked participants: “I’ve got just under a month left to start if I want to have three kids!” [EA]. There was clear concern about the dilemma they would face in the future when trying to balance a career and having a family “…you need to get across how little time you have got. That you can’t wait. You hear all the stories in the media about women and fertility, but you never hear the facts.” [A]. The converse could also be true: “but here you can get to 32 and still have like 90% chance (of having children) so I thought that was quite nice” [EA-M].

Concern about the worry that fertility information could elicit was also expressed: “I like the idea of younger women getting this information but at the same time you don’t want to stress us out with this. There is a bit of a danger in communicating some of these

things."; "[the Guide] … is not scare-mongering but it does elicit like a fear in you" [EA]. There was also some concern that fertility information could cause fear-induced behaviour change: "… if I read this [the Guide] in 6th form [college] I'd be like I don't have time to go to University I need to start a family; like it would scare me" [EA]. Finally, the information could increase the perceived threat of fertility problems generally, "… that I'm going to be infertile. It's a big unknown it's not till you think about it that you worry about it" [EA], or due to personal circumstance "the menopause thing … mum and my nan both had a really early menopause so now I'm really scared about my future" [EA] or from learning the prevalence of infertility "I was surprised at how many people it affects because I don't personally know anybody that (has) openly struggled with it" [EA-M].

Two other facts were commented upon. First, was the limitation of reproductive technologies to overcome fertility problems (e.g., "how low" the success rates were). Second, the critical thresholds for the effects of some behaviours such as smoking and alcohol consumption shocked many because participants expected thresholds to be much higher "I didn't realise … 10 cigarettes a day isn't … that much but it can clearly have a significant effect on fertility" [A-M].

c. Benefits of fertility education

There were several perceived benefits. First, participants reported learning new information "I'd say like 80% of stuff in that (Guide) I didn't know about" [EA-M] or reinforcing vaguely known content. There were several new pieces of information, namely some risk factors or signs and symptoms of fertility problems (e.g., obesity, mumps), facts about fertility (e.g., prevalence of infertility, typical time to pregnancy), and some uses of reproductive options (e.g., to help gay people become parents). The decline of fertility with age was discussed at length, especially areas of confusion related to ovarian reserve "I

don't know where I thought [eggs] came from … all those eggs are in you from birth!" [EA]. Information could also trigger recall of previously learnt information "things that I might have known like vaguely before" [A].

A second benefit was the increased awareness of fertility health "stuff that you just wouldn't even know [to know]" [F-EA]; "… to think more deeply about fertility. I didn't realise it affected so many people" [A-M], especially in younger people for whom fertility would not be that relevant "I doubt I'd [have] read it unless I was given it" [EA]. It was perceived that information could also help to change modifiable risk factors "hearing that [alcohol] would affect my fertility would definitely make me not have that amount" [EA]; "it's a good piece of statistics … to prevent people from doing things you don't want them to do" [EA].

Third, participants reported now feeling "more comfortable talking about the subject of fertility" [A-M]. The focus on contraception in current school education on sex and relationships was raised, as it was felt this gave an unrealistic idea of fertility "everything you hear at school is about how easily you fall pregnant not that you might have problems" [A], "you end up feeling that if you sit on a toilet you'll fall pregnant, but it can be hard" [A]. There was surprise at the idea of a male biological clock "you seem to think that men can carry on having babies into their eighties" [A].

A fourth benefit was more informed decisions. Participants felt reassured that if they had fertility problems in the future then they could still possibly achieve parenthood "having fertility problems is not the end of your chance of having a kid" [A-M] because of available reproductive technologies "… you get a bit concerned [but] the back page [on reproductive technologies] makes you feel a lot better about yourself. You get hit with the bad news first …" [A-M], "…seeing those statistics definitely puts things into perspective. Like we don't want to get to an age where it's not longer a choice" [EA-M]. Other participants felt that the

Guide was a valuable document that would benefit individuals in their decision-making because its content was perceived to be generally unknown. However, a discussion about the optimum age to receive fertility education produced differing views on whether it would be appropriate in primary or secondary schools "...primary school might be too young for this conversation, they might be too immature" [A], "but they [young people] do need to know some of it. Having access to this information is good. It just has to be aimed at different ages" [EA]. The idea that fertility education should be offered to both sexes was also raised "men need to know about it too, about women's bodies" [A].

d. Feasibility and acceptability of the Guide.

The general consensus in both age groups was that 'A Guide to Fertility' was informative, laid out well, accessible, generally understandable and a good piece of health documentation covering desirable fertility topics. Participants commented on the usefulness and placement of graphs and tables.

Nevertheless, some recommendations were made to improve the brochure. First, it was considered to be too wordy and described as different from typical ones found at doctors' surgeries due to its length, covering of multiple topics and lack of pictures. The issue of classification of body weight sparked some discussion because body mass index (BMI) was not perceived to be an effective measure of obesity (e.g., weight differential with more muscular people), calling into question its ability to detect effect of weight on fertility. The need for a standard measure of weight was nevertheless accepted. Participants concluded that information regarding diet might be useful in the brochure. Some liked the graphics and found this helped them to understand "it's really informative, I like it. All the statistics are good, very interesting and the graphics are easy to understand [A]", "graphics make it less 'numbers on a piece of paper' " [A], but a minority found the graphics

confusing. In general, the participants referred to the need for clarification for example, complex terminology not defined (e.g., medically assisted reproduction) or vague terminology that could ignite concern (e.g., "…severe period pains…that's very ambiguous" [EA] especially when people perceived the content to apply to them personally.

There was uncertainty about the information in the Guide and how to best integrate it. The abbreviated content of the guide increased participants desire to seek out more fertility information but it could also cause uncertainty about fertility facts. This exchange among emerging adults illustrates this well (not all discussion shown between start and end point):

> "…all those eggs are in you from birth"/"…like your future child is in there"/"…like Russian dolls [M]"/"…that's a lot if they all fertilise"/"…you don't have all these eggs coming out of you"/"…only 1 can be ovulated"/ "…how are we losing them (eggs)"/"you don't lose one at a time [M]"/"shedding of the uterus"/"so where are all these others disappearing?"/"they might still be there but really bad quality"/"they're maybe just decomposing in you"/"what does bad quality mean? Does that mean you'll have a bad quality child" [Researcher interrupts to clarify]

Similarly, lack of guidance caused uncertainty about how to apply the fertility information provided to their daily life, as illustrated in the discussion among these emerging adults about their perceptions of the most important issue discussed:

> "Preventable things"/"drinking is really common"/"I don't think I'd listen to that [M]"/ "Maybe if I was trying to get pregnant…maybe I should stop smoking"/ "now you can still smoke 20 a day"/"…is that how it works"/"it's not telling you to stop drinking…it's telling you not to have six glasses of wine a week"/"I think that's better than [what] we do, going out and drinking loads at once…"/"not for me…useful for someone else"/"the menopause for me that's …the really big thing…because I've got (family history of early menopause)"/[researcher says: you would pay attention to family history over the other factors of smoking and drinking?]/"yeah because I need to factor that in, I can't ignore it".

Finally, information in the guide could be misleading: "…people could be making decisions on this kind of information (in Guide) … it's fine I can freeze my eggs or … I can get IVF in the future not knowing that they might not be able to (do this) because … (of) other factors …(that) affect whether you can have access" [EA].

2. Themes unique to an age group

a. A lack of confidence in one's fertility knowledge among adolescents

Adolescents and emerging adults indicated a lack of confidence in their understanding of fertility issues. However, insecurity was more prevalent in the adolescent groups, who frequently offered content tentatively or looked at their peers for guidance and reassurance before bringing up issues "Would you [looking to peers] count dolly the sheep as being linked to fertility?… wasn't it [checks with peers] implanting like they do, all the cutting and implanting" [A-M]. Similarly, the adolescents often visually checked with the

researcher to confirm whether their responses were correct. Girls in the adolescent group talked than boys, whereas the reverse was true in emerging adult group.

b. Gender issues among emerging adults

The emerging adults referred to gender when discussing fertility awareness, more so than the adolescents "I think when you think of fertility you kind of just assume it's, well I kind of assume it's just the woman"). Some comments arose due to the education brochure being focused on women "I was surprised that there weren't any signs [of infertility] for men" [M]. However, gender was also discussed in relation to explaining the pressure participants perceived each gender to experience in reference to fertility: "not being able to have a baby, it is all tied up with the role of a woman" [A], or another "I have not even considered men when I hear about fertility – I have just assumed it is all about the woman because they are carrying the baby" [A]. The majority of girls had already thought about having a family at some point in the future, and said that they had started to think about having children from an early age "I was never asked much about my career, about what I wanted to do. It was more questions about my family role, being a mother" [EA]. One man stated he would defer the decision of using reproductive technologies to his partner, with agreement from others: "I can't make those choices for her because I'm not physically carrying out that action (having IVF)" [EA-M].

c. The need to plan for fertility in emerging adults

The emerging adults made more references to the need to incorporate thinking about having a family "like the whole idea of fertility is a lot more complex than I first thought, like I wouldn't … generally don't really think about it". "I feel like people should probably look into this before they seriously consider having children…it would help them make more

informed decisions…" [M]. Reference was made to the need for forward planning about age and financial status "[fertility education] gives people more time to consider because like getting pregnant isn't just about your fertility there's other factors involved in the decision to get pregnant: [e.g.] your financial status". Participants expressed concern regarding how to fit in a successful career alongside having children "you want a career and things as well") before the decline of their fertility. Participants felt that women had a considerably larger number of factors to consider when planning their future fertility than men and were "definitely at a disadvantage compared to a man".

Discussion

The findings of this study provide useful insight into the fertility knowledge of adolescents and emerging adults and their perceptions of the provision of fertility education. Adolescents and emerging adults welcome the opportunity to learn about fertility but struggle (particularly women) to integrate newfound knowledge at their stage of life without worrying about its implications for them now or in the future. According to these young people, fertility education should be delivered but needs to be tailored to different age groups to make it meaningful and optimise its benefits over costs. Educators and researchers need to work together to determine what fertility content needs to be known at different ages and how best to disseminate it to relevant age groups.

Young people in the present study had some fertility knowledge, but its nature, depth and coverage did not suggest they would be able to make informed decisions about their fertility, as found in other studies (Heywood, Pitts, Patrick, & Mitchell, 2016; Littleton, 2014). The information in the Guide reflected the content tested in fertility education studies and what is considered to be relevant to fertility awareness (Zegers-Hochschild et al., 2017). Participant responses to this material indicated they learnt new facts, critical

thresholds and found the information useful for the planning of family. Nevertheless, young people questioned why they needed to know all the information presented and how it should be integrated at a stage of life not concerned with starting a family, as per other studies (Heywood et al., 2016). Most young people, including those participating in our focus group, spent very little time thinking about their fertility beyond the simple desire to have children (Hammarberg, Collins et al., 2017). How and when parenthood goals should be pursued is not tackled until people feel ready to actually start a family. This goal-orientated approach to information means that information is difficult to integrate when it is not yet needed or sought after. This difficulty mirrors that reported for teenage girls struggling to integrate the fertility information they encounter in the course of everyday life (Littleton, 2014).

Difficulty integrating fertility information and methods to achieve integration need to be identified in future research. Difficulties could be due to for example, providing too much information (amount problem) or information with varying levels of relevance to the age group (topic problem), too much or too little depth (depth problem), or lack of contextualisation to support relevance of information to specific age groups (context problem). To illustrate, young people might more easily integrate fertility information if it was contextualised according to misconceptions relevant to the specific age groups. Past qualitative research showed that 30% of young heterosexual women (majority < 24 years) with an unplanned pregnancy believed themselves to be “subfecund” due to misconceptions about past reproductive behaviours (e.g., abortion, use of hormonal contraception), perceived fertility effects of medical illnesses, and inferences about non-pregnancy in previous episodes of unprotected intercourse (Frohwirth, Moore, & Maniaci, 2013). Tailoring fertility information to match the knowledge, beliefs, environment, past experiences or gender has been done in some initiatives (e.g., yourfertility.org;

Hammerberg, Norman et al., 2017), and has been shown to produce more informed decision making (Edwards et al., 2006), but has not yet been done for specific age groups. Future research also needs to examine what young people learn from information provision. Our quantitative survey showed short-term gains for 21 to 24 year olds could be achieved (Boivin et al., 2018) but retention over the longer-term was not evaluated. Other methods of engaging young people should also be investigated (e.g., use of the arts).

The provision of information also raised more general societal issues. Despite the significant shifts in childbearing norms, societal and occupational support for families and great strides in reproductive technologies, young women still worry about how best to satisfy their desire and goals for education, career and family. The provision of fertility information appeared to ignite worries that not all of these would be satisfied. Women in the emerging adults groups in particular felt pressurised and made anxious by fertility information, as per other quantitative research (Boivin et al., 2018; Maeda et al., 2016) and felt it to be threatening of their other goals (e.g., career). In research with teenage girls, incongruence between fertility and other goals was managed by disregarding bodily limitations, for example declaring older parenthood acceptable if it was what the woman wanted even when knowing about age-related fertility decline (Littleton, 2014). There is a rich and long history of studies addressing motherhood and career decision-making with different generations finding their own ways of balancing these (Roy, Schumm, & Britt, 2014) and one would expect millennials and generation Z to do the same. In the present sample people were relieved that reproductive technologies could help overcome some problems of family building, but surprised by their low success rates and unsure about accessibility. This uninformed willingness points to the need for better information about using these techniques, especially among emerging adults who were more concerned about planning for a family.

About 27% (*n*=9) of the sample was young men. Men contributed significantly to the focus groups and had similar reactions to women, though some topics seemed more often initiated by men (e.g., critical thresholds for drinking) and others more by women (e.g., career-family balancing); with so few participants these impressions are not conclusive. However, it can be concluded that men were interested in the fertility information, engaged with the discussions and seemed concerned too about how to use fertility information. As such they should be involved equally to women in the initiatives to disseminate fertility information. We did not specifically study gender differences in reactions to the fertility information and did not observe any major difference in content between the mixed and female only group other than that the latter discussed menstrual health in more detail (e.g., heaviness and pain of periods). However, we did notice that in the adolescent age-group girls spoke less than boys, whereas in the older age group the reverse was true (women spoke more than men). This could be due to an age difference in ease and confidence of talking about fertility in front of the other gender, or to the specific composition of our group. One emerging adult man referred to deferring decision-making about using ART to his partner, which aligns with perceptions among adult male users of ART. It could be that beliefs about responsibility for reproductive choice, starts early in life. Future research could address in more detail whether gender composition facilitates or hinders discussion of fertility topics.

Limitations of the study include convenience sampling from diverse sources. There is a need for replication of the study with other populations of adolescents and emerging adults. However, consistency between the present study and past findings (e.g., lack of knowledge) also adds weight to these being substantive issues in the younger population. Another limitation is the technical problem whereby one of the focus group was not recorded. Analysis of this group relied on the note taker's detailed records but we

acknowledge that these would have been less detailed then a recording (e.g., recording of pauses, hesitations). Focus groups were between 45 and 60 minutes due to the constraints of young people having to return to lessons, lectures or weekend activities. It could be that more topics would have emerged with a longer discussion time.

In conclusion, the current study shows young adults want and benefit from the provision of fertility information and shows poverty of knowledge applies to adolescents and young men too. Young people welcome fertility information but qualitative data illustrates the need for it to be tailored to specific age groups to maximise its benefits and ensure young people can integrate the information they need to maintain reproductive health and make informed decisions about future parenthood. Educators and researchers need to work together to increase accessibility of fertility information.

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